# Journal of Quantitative Spectroscopy & Radiative Transfer

**List of Contents and Author Index**
**Volume 89, 2004**

**doi:10.1016/S0022-4073(04)00277-8**

ELSEVIER

# JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER

**Editor-in-Chief:** Professor P. Varanasi, *149 Dana Hall, Marine Sciences Research Center, State University of New York, Stony Brook, NY 11794-5000, U.S.A. E-mail:* jqsrt@notes.cc.sunysb.edu

**Advisory Committee:** R. M. Goody (U.S.A.), H. R. Griem (U.S.A.), J. W. Hovenier (The Netherlands), R. W. Nicholls (Canada), W. Whaling (U.S.A.), and W. L. Wiese (U.S.A.)

## Associate Editors

*Term ending 31 December 2004*

T. Ackerman, *Pacific Northwest Nat. Lab, P.O. Box 999, K9-90 Richland, WA 99352, U.S.A.*

R. G. Ellingson, *Department of Meterology, Florida State University, Tallahassee, FL 32306, U.S.A.*

R. K. Hanson, *High Temperature Gas dynamics Laboratory, Department of Mechanical Engineering, Stanford University, Stanford, CA 94305, U.S.A.*

N. Jacquinet-Husson, *ARA/Laboratoire de Meteorologie Dynamique du CNRS, Ecole Polytechnique, 91128 Palaiseau Cedex, France*

K. Lumme, *Observatory, P. O. Box 14, Tähtitorninmäki, FIN-00014, University of Helsinki, Finland.*

C. P. Rinsland, *NASA – Langley Research Center, Mail Stop 402, Hampton, VA 23681-3142, U.S.A.*

L. S. Rothman, *Harvard-Smithsonian Center for Astrophysics, Atomic and Molecular Division, MS 50, 60 Garden Street, Cambridge, MA 02138-1516, U.S.A.*

N. Selçuk, *Chemical Engineering Department, Middle East Technical University, 06531 Ankara, Turkey.*

W. Wiscombe, *Climate and Radiation Branch, NASA-Goddard Space Flight Center, Mail Code 913, Greenbelt, MD 20771, U.S.A.*

*Term ending 31 December 2005*

A. Barbe, *Groupe de Spectrométrie Moléculaire Atmosphérique, Faculté de Sciences, BP 347, 51062 Reims Cedex, France*

K. V. Chance, *Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, U.S.A.*

S. A. Clough, *Atmospheric and Environment Research, Inc., 131 Hartwell Ave., Lexington, MA 02420, U.S.A.*

A. L. Crosbie, *Thermal and Radiative Transfer Group, Department of Mechanical and Aerospace Engineering, University of Missouri-Rolla, Rolla, MO 65401, U.S.A.*

D. P. Edwards, *Atmospheric Chemistry Division, National Center for Atmospheric Research, P.O. Box 3000, Boulder, CO 80307-3000*

H. Fischer, *Institüt für Meteorologie und Klimaforschung, Forschungszentrum, Universitität Karlsruhe, P. O. Box 3640, 76021 Karlsruhe, Germany.*

A. Goldman, *Department of Physics, Space Science Laboratory, Rm 316, University of Denver, 2112 E. Wesley Street, Denver, CO 80208, U.S.A.*

R. W. Lee, *Department of Physics, University of California, Berkeley, L-411 Physics, P.O. Box, 808, Livermore, CA 94550*

K. N. Liou, *Dept. of Atmospheric Science, University of California, 405 Hilgrad Ave., Los Angeles, CA 90095*

M. P. Mengüc, *Department of Mechanical Engineering, 269 RGAN Building, University of Kentucky, Lexington, KY 40506-0503.*

C. Van de Mee, *Dip. Mathematica, Universitià di Cagliari, Via Ospedale 72, 09124 Cagliari, Italy.*

*Term ending 31 December 2006*

R. Beer, *M/S 183-301, Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109-8099, U.S.A.*

J. E. Lawler, *Department of Physics, University of Wisconsin-Madison, 1150 University Avenue, Madison, WI 53706, U.S.A.*

M. I. Mishchenko, *NASA-Goddard Institute for Space Studies, 2880 Broadway, New York, NY 10025, U.S.A.*

T. Viik, *Tartu Observatory, Toravere, EE 2444, Tartumaa, Estonia.*

**Founding Editor:** Professor S. S. Penner, *UCSD, La Jolla, CA 92093-0310, U.S.A.*

**Author enquiries.** For enquiries relating to the submission of articles (including electronic submission where available) please visit Elsevier's Author Gateway at http://authors.elsevier.com. The Author Gateway also provides the facility to track accepted articles and set up e-mail alerts to inform you of when an article's status has changed, as well as detailed artwork guidelines, copyright information, frequently asked questions and more.
Contact details for questions arising after acceptance of an article, especially those relating to proofs, are provided after registration of an article for publication.

**Advertising information.** Advertising orders and enquiries can be sent to: **USA, Canada and South America:** Mr Tino DeCarlo, The Advertising Department, Elsevier Inc., 360 Park Avenue South, New York, NY 10010-1710, USA; phone: (+1) (212) 633 3815; fax: (+1) (212) 633 3820; e-mail: t.decarlo@elsevier.com. **Europe and ROW:** Katrina Barton, Print Operations Co-ordinator, Elsevier, 84 Theobalds Road, London WC1X 8RR; phone: +44 (0) 20 7611 4117; fax: +44(0) 20 7611 4463; e-mail: k.barton@elsevier.com.

© 2004 Elsevier Ltd. All rights reserved.

**Publication information:** Journal of Quantitative Spectroscopy & Radiative Transfer (ISSN 0022–4073). For 2004, volumes 84–90 are scheduled for publication. Subscription prices are available upon request from the Publisher or from the Regional Sales Office nearest you or from this journal's website (http://www.elsevier.com/ locate/jqsrt). Further information is available on this journal and other Elsevier products through Elsevier's website: (http://www.elsevier.com). Subscriptions are accepted on a prepaid basis only and are entered on a calender year basis. Issues are sent by standard mail (surface within Europe, air delivery outside Europe). Priority rates are available upon request. Claims for missing issues should be made within six months of the date of dispatch.
**Orders, claims, and journal enquiries:** please contact the Customer Service Department at the Regional Sales Office nearest you:
**Orlando:** Elsevier, Customer Service Department, 6277 Sea Harbor Drive, Orlando, FL 32887-4800, USA; phone: (+1)(877) 8397126 [toll free number for US customers], or (+1) (407) 3454020 [customers outside US]; fax: (+1) (407) 3631354; e-mail: usjcs@elsevier.com.
**Amsterdam:** Elsevier, Customer Service Department, PO Box 211, 1000 AE Amsterdam, The Netherlands; phone: (+31) (20) 4853757; fax: (+31) (20) 4853432; e-mail: nlinfo-f@elsevier.com.
**Singapore:** Elsevier, Customer Service Department, 3 Killiney Road, #08-01 Winsland House I, Singapore 239519; phone: (+65) 63490222; fax: (+65) 67331510; e-mail: asiainfo@elsevier.com.
**USA mailing notice:** Journal of Quantitative Spectroscopy & Radiative Transfer (ISSN 0022–4073) is published in 7 volumes per year (4 issues per volume, 2 issues per month with additional issues in February, May, September and December) by Elsevier Ltd., (P.O. Box 211, 1000 AE Amsterdam, The Netherlands). Annual subscription price in the USA US$ 5510 (valid in North, Central and South America), including air speed delivery. Periodical postage rate paid at Jamaica, NY 11431.
**USA POSTMASTER:** Send address changes to Journal of Quantitative Spectroscopy & Radiative Transfer, Publications Expediting Inc., 200 Meacham Ave, Elmont, NY 11003.
**AIRFREIGHT AND MAILING** in the USA by Publications Expediting Inc., 200 Meacham Avenue, Elmont, NY 11003.

∅ The paper used in this publication meets the requirements of ANIS/NISO Z39.48-1992 (Permanence of Paper)

ELSEVIER

Journal of Quantitative Spectroscopy & Radiative Transfer 89 (2004) III–V

Journal of Quantitative Spectroscopy & Radiative Transfer

www.elsevier.com/locate/jqsrt

# List of Contents

## NUMBERS 1–4

**Special issue: VII Electromagnetic and Light Scattering by Non-Spherical Particles: Theory, Measurement and Applications**


| | | |
|---|---|---|
| **T. Wriedt** | 1 | Preface |
| **F.J.G. de Abajo** | 3 | Electromagnetic forces and torques in nanoparticles irradiated by plane waves |
| **J. Aizpurua, L. Blanco, P. Hanarp, D.S. Sutherland, M. Käll, G.W. Bryant** and **F.J.G. de Abajo** | 11 | Light scattering in gold nanorings |
| **A.J. Baran** | 17 | On the scattering and absorption properties of cirrus cloud |
| **L.A. Blanco** and **F.J.G. de Abajo** | 37 | Spontaneous emission enhancement near nanoparticles |
| **M.A. Iatì, R. Saija, A. Giusto, P. Denti, F. Borghese** and **C. Cecchi-Pestellini** | 43 | Optical properties of interstellar grain aggregates |
| **Y. Eremin** and **T. Wriedt** | 53 | Discrete sources method model for evanescent waves scattering analysis |
| **E. Eremina** and **T. Wriedt** | 67 | Light scattering analysis by a particle of extreme shape via discrete sources method |
| **C. Esen, T. Weigel, V. Sprynchak** and **G. Schweiger** | 79 | Raman spectroscopy on deformed droplets: theory and experiment |
| **S. Havemann** and **A.J. Baran** | 87 | Calculation of the phase matrix elements of elongated hexagonal ice columns using the *T*-matrix method |
| **J. Hellmers** and **T. Wriedt** | 97 | Influence of particle shape models on T-matrix light scattering simulation |
| **V.G. Farafonov, M.S. Prokopjeva** and **V.B. Il'in** | 111 | Analytical averaging of cross-sections for randomly oriented layered particles in the modified *T*-matrix method |
| **C. Li, G.W. Kattawar** and **P. Yang** | 123 | Effects of surface roughness on light scattering by small particles |

| | | |
|---|---|---|
| **N.G. Khlebtsov, V.A. Bogatyrev, A.G. Melnikov, L.A. Dykman, B.N. Khlebtsov** and **Ya.M. Krasnov** | 133 | Differential light-scattering spectroscopy: a new approach to studying of colloidal gold nanosensors |
| **N.G. Khlebtsov** | 143 | Optical models for conjugates of gold and silver nanoparticles with biomacromolecules |
| **H. Kimura** and **I. Mann** | 155 | Light scattering by large clusters of dipoles as an analog for cometary dust aggregates |
| **M. Kocifaj** and **J. Klačka** | 165 | Dynamical behaviour of interstellar dust particles in the solar system |
| **O. Krauß** and **G. Wurm** | 179 | Radiation pressure forces on individual micron-size dust particles: a new experimental approach |
| **U.K. Krieger, T. Corti** and **G. Videen** | 191 | Using photon-counting histograms to characterize levitated liquid aerosol particles with a single, solid inclusion |
| **A.G. Kyurkchan** and **S.A. Manenkov** | 201 | The application of the modified discrete sources method to the problem of wave diffraction on a body in chiral half-space |
| **A.G. Kyurkchan** and **S.A. Minaev** | 219 | Using of the wavelet technique for the solution of the wave diffraction problems |
| **A. Kyurkchan** and **D. Demin** | 237 | Pattern equation method for solving problems of diffraction of electromagnetic waves by axially symmetric dielectric scatterers |
| **P. Laven** | 257 | Simulation of rainbows, coronas and glories using Mie theory and the Debye series |
| **V.A. Loiko** and **G.I. Ruban** | 271 | Absorption by a layer of densely packed subwavelength-sized particles |
| **V.V. Berdnik, R.D. Mukhamedyarov** and **V.A. Loiko** | 279 | Sizing of soft spheroidal particles by multiangle scattered light intensity data: application of neural networks |
| **I. Mann, H. Kimura** and **L. Kolokolova** | 291 | A comprehensive model to describe light scattering properties of cometary dust |
| **A. Penttilä** and **K. Lumme** | 303 | The effect of particle shape on scattering—A study with a collection of axisymmetric particles and sphere clusters |
| **A. Quirantes** and **S. Bernard** | 311 | Light scattering by marine algae: two-layer spherical and nonspherical models |
| **N. Riefler, S. di Stasio** and **T. Wriedt** | 323 | Structural analysis of clusters using configurational and orientational averaging in light scattering analysis |
| **V. Rysakov** and **F. Rejmund** | 343 | Analysis of particle distribution according to sizes with improved resolution |
| **D.E. Sukhanov** and **Y.A. Eremin** | 349 | Wave scattering analysis based on discrete sources method |
| **T. Weigel, J. Schulte** and **G. Schweiger** | 365 | Inelastic scattering on nonspherical particles |

**G. Wurm, H. Relke, J. Dorschner and O. Krauß** 371 Light scattering experiments with micron-sized dust aggregates: results on ensembles of $SiO_2$ monospheres and of irregularly shaped graphite particles

**Y.-l. Xu** 385 Radiative-scattering signatures of an ensemble of nonspherical particles

**P. Yang, Z. Zhang, B.A. Baum, H.-L. Huang and Y. Hu** 421 A new look at anomalous diffraction theory (ADT): Algorithm in cumulative projected-area distribution domain and modified ADT

**E. Zubko, Y.G. Shkuratov and G. Videen** 443 Coherent backscattering effect for non-zero elements of Mueller matrix of discrete media at different illumination–observation geometries

**M. Köhler and I. Mann** 453 Light-scattering models applied to circumstellar dust properties

I List of Contents/Author Index for Volume 89